WARMING AND VENTILATION.

TO THE EDITOR.

SIR,—After a careful perusal of your abstract of Mr. Bernhardt's papers, I confess (with due submission) that I am unable to discover any thing therein that at all changes my opinion of that gentleman's pretensions, or of Dr. Ure's qualifications. I am sorry Mr. Bernhardt still refuses to furnish *any data* by which the merits of his system might be fairly judged, as much time and space would have been thereby saved; however, he must of course act as he pleases. I think your readers will agree with me that he has failed to shew how his interests could suffer by the disclosure of what he calls his secret.

I shall not pursue this subject any farther *at present*, as I am anxious to enter upon a course which I think more likely to be useful to your readers and the public, namely, a developement of the principles of a system of warming and ventilating large buildings efficiently and economically. Before, however I go into this subject, I wish to lay before your readers a few examples in which these objects have been sought to be attained in some cases that have fallen under my own observation, which will, I think, prove the necessity of the present discussion which some appear to doubt.

The first case which I shall mention is that of the establishment of Mr. Bentley, the eminent bookseller and publisher of Burlington-street. About the year 1838, Mr. Perkins was employed to fit up this establishment with his system of hot water circulation, which, to those unacquainted with it, may be thus described. In the basement is placed a furnace in which is coiled a quantity of iron pipes, the top of which coil is carried up through the flooring and down one side of the range of offices intended to be warmed, returns by the opposite side to the same room, and again passing through the floor is connected to the bottom of the coil in the furnace. I should mention that a larger pipe is attached to the upper range of pipe, so that as the water in the pipes is expanded by the heat, it rises in this larger pipe, and thus relieves the pressure which would prevent the circulation of the water in and burst the pipes.

The whole of the small pipe being filled with water, and a fire lighted in the furnace, the heated particles of water (being lighter) rise to the upper level and are replaced by the colder water in that part of the pipe connected with the lower part of the coil; thus the water is continually circulating through the whole length of the pipe, and in its passage gives out heat (chiefly by contact) to the surrounding air. These pipes are about one inch and an eighth diameter, and pass, as was observed, once round the rooms. I was informed that the apparatus was fitted up under Mr. Perkins's own direction, and cost a large sum; open fires had been previously in use.

This system was continued in use three successive seasons, and then given up for the following reasons:—

First—The cost was nearly equal to the open fires.

Secondly—The warmth obtained very local and insufficient.

Thirdly—The furnace required replacing frequently at a considerable expense.

Fourthly—The health of all the gentlemen employed there suffered very much from the effects produced on the atmosphere of the offices by the overheated surfaces of the pipes; producing the identical symptoms of disturbed health described by Dr. Ure in his Custom-house Report quoted in a former letter.

I measured one of these offices, and the quantity of pipe in it, carefully, and will shew by-and-by the heat which the pipes would have required to be kept at in order to maintain this office at a proper temperature, supposing it to have been ventilated, for which (to my surprise) *no provision whatever had been made!!!* except that the chimney-place was left open.

It is worthy of being remembered, that in this case, all the pernicious consequences of warming air by overheated metallic surfaces followed, and yet that the amount of heat produced was insufficient to raise the air to a comfortable temperature, and that a return to the use of open fires was attended with exemption from the symptoms of disturbed health mentioned above. (See Note 1.)

The second case which I have selected is that of an infirmary for diseases of the chest, situated in Artillery-street, Bishopsgate-street, in which neighbourhood it has been established about thirty years, and gives medical aid, in that particular class of disease, to a great number of out-patients, and also to a more limited number who are received into the infirmary and provided for during the winter season.

It is impossible to overrate the value to the public of establishments of this nature, conducted upon proper principles, when it is remembered that fully one-third of our population die of these formidable diseases, consumption and asthma, and that from their lingering nature they are not generally received into the hospitals; in such an institution we expect to meet with every arrangement for alleviating the distressing symptoms peculiar to diseases of the respiratory organs, which a sympathizing benevolence, guided by science, could suggest; but above all, to find an institution of the kind established so many years a model of perfection in respect of warming and ventilation.

Having received a hint from Dr. T. Herbert, who appears to take a great interest in the subject of ventilation, from motives of benevolence, I applied to Dr. Ramadge, the senior physician to the above charity, for permission to inspect the general arrangements of the infirmary, particularly those connected with the subjects I am more particularly interested in, which request that gentleman very politely acceded to, and I accordingly proceeded to view the place, and will now endeavour to convey some idea of what I observed.

The building, as I before observed, is situated in Artillery-street, at the corner of Gun-street, and is in the immediate neighbourhood of *Wentworth-street and Petticoat-lane;* it is in the form of a trapezium, having its two longest sides nearest the street; the other two sides, abutting against the adjoining buildings, do not admit of ventilation in that direction: it is three stories high. On the ground floor are three small rooms; that to the right as you enter is the consulting-room, the one on the left the dispensing-room, and one at the end of the passage being used, together with the passage, by the patients waiting for advice. The first floor, by far the best in the house, consists of three rooms, and is occupied by the house-keeper and servants; the second and third floors being intended to be appropriated to the use of those patients who are received into the house.

It is to these floors that I wish to direct attention more particularly: the front room (second floor) is about 28 by 14 feet, the back room about 11 by 18 feet, and the height of both 8 feet; the rooms on the third floor are of the same dimensions of floor, but scarcely 6 feet high, from which reason it has been deserted as useless; seven beds are made up in the front room (second floor), and three in the back room, which I need scarcely say are always occupied; each patient is also allowed two visitors, crowding occasionally a large number of persons into a very small space.

In the advanced stages of these diseases a uniform and warm temperature was considered by the founder of the institution, Dr. Buxton (as I was informed), to be a desideratum, and accordingly, to produce an artificial atmosphere, in "imitation of the mild and genial climes of Italy or Madeira," was the object aimed at in the arrangement now to be described.

In the first place, all the chimney-places, except a very tiny one in the front room, are carefully stopped up with plates of sheet iron, to prevent any communication with the external air by means of the chimneys. Secondly, two grotesque antique German stoves, of the commonest kind, stand about three feet into the room on sheets of lead, in such close proximity to the patients' beds, that they must suffer the greatest inconvenience from the heat; another of these three-legged German stoves is placed in the back room, the chimney of which is also (as observed) stopped up by iron plates, through holes in which the pipes or flues of the stoves pass into the chimney.

This kind of stove, notwithstanding every care, will frequently attain a red heat, in which state their temperature will be 1,077 degrees Farenheit, or just 865 degrees more than the proper temperature for heating furnaces as laid down by Tredgold and others, namely, 212 degrees (see note 2); and in ordinary circumstances the temperature of these stoves will seldom be less than 400 degrees.

The effects produced on the health of the inmates, and especially on that of the unfortunate patients, we shall speak of when we have described the peculiar mode by which the air is furnished to this "mimic Madeira."

In the corner where the adjoining buildings meet, a space parallel to the staircase, and passing from the ground floor to a *fixed!* skylight in the roof, is boarded off; and small hinge windows are furnished at each floor; at the bottom of this air-shaft, on the ground floor, are the two small privies used by the patients, communicating by an open drain with a large cesspool in the cellar, into which the rain have opened several communications. It appears that in this neighbourhood there are no sewers, so that this place must be occasionally emptied; there being no outlet from this shaft except through the small windows mentioned, no one can conceive the abominable effluvia with which this place is continually filled, leaving a thick deposit on the surface of the walls, but ill-concealed by daubs of whitewash. In this detestable place and between the two privies is located the domestic water-butt, the absurdity of which arrangement I need not say one word about.

Now, in the winter, when the temperature of the rooms is raised, light, the cooler air in this foul air-shaft must be drawn into the rooms continually, and breathed by the patients and other inmates, thus completing a picture of human folly and ignorance, which, it is to be hoped, has few parallels in any city in civilized Europe.

The effects produced on the patients' health are exactly what might be expected: within the first few weeks, the patients almost uniformly exhibit constitutional excitement, manifested by headache, flushed face, glistening and suffused eyes, accelerated pulse and respiration, dry heat of the skin, &c.: to these often succeed symptoms of an opposite character; such as general depression, debility of a sudden and marked character, cold, clammy perspirations, loss of appetite: these have at times reduced the patients to such a state, that, unless promptly withdrawn, they are almost certain to sink under them.

It is but just I should add, that Dr. Ramadge stated he felt the absurdity and mockery both of the end aimed at, and the means mischievously employed to attain it; that he had often urged the necessity of a change of system, but that he possessed no control over the internal arrangements of the infirmary; but these are matters which of course cannot be properly discussed in THE BUILDER, my aim being to shew that great ignorance or apathy exists in the public mind on the subjects of warming and ventilation.

Case 3 is that of a large public building erected by Charles Barry, Esq., architect of the New Houses, and shews how many hundreds of pounds were thrown away to no purpose in the said building; and, at the same time, shews the value of that gentleman's opinion upon such matters (see Testimonials); but as I have already exceeded the proper limits of this letter, I must defer it until another opportunity.

There is just one point in Mr. Bernhardt's paper which, in conclusion, I will advert to. He says (third paragraph, middle column, page 313), "*The warmth*, as produced by my apparatus, is from a continual change of air, *properly called ventilation.*" The warmth is properly called ventilation!! Surely, Mr. Editor, you must have been quizzing him in placing this sentence in your abstract.

I remain, Sir, very respectfully,

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Note 1. The facts mentioned in this case I give on the authority of a gentleman now in Mr. Bentley's employ, and whose health suffered much during the time the pipes were in use. The pipes and furnace are still where Mr. Perkins left them.

Note 2. Mr. Bernhardt surely gives a most erroneous opinion on the merits of Mr. Tredgold's work on ventilation, as a work more free from useless theory does not exist in our language. Mr. Tredgold states in his preface that he intended to furnish a work of a purely practical nature, and therefore, says he, "I thought it best to suppress, as much as possible, the technical forms of science, and where it was not easy to avoid them, without either a sacrifice of generality, or giving rules without the reasoning on which they are formed, *I have added them in notes*, so that they may be consulted or not at the reader's pleasure;" and well did he perform his promise.

THE SECRETARY TO THE FINE ARTS COMMISSION.—C. L. Eastlake, Esq., R.A., has received from his Royal Highness Prince Albert a present of a diamond ring, of great value, in testimony of his high appreciation of Mr. Eastlake's services in forwarding the objects of the Commission. We rejoice to record an incident no less honourable to the illustrious originator of the commission than to the distinguished artist by whom it has been conducted to results which even already form a glory of the age and country. We understand that the autograph letter which accompanied the gift is such as to render that gift immeasurably more valuable in the estimation of the receiver. The public owe to Mr. Eastlake a debt which cannot be so soon discharged; it is one that may be paid by the satisfaction he will receive in having done more within a year to elevate his profession than any single individual has been able to achieve in half a century. To that profession he has rendered incalculable service—service tangible, solid, and substantial. We know that in art and in literature both, it has been said, and generally believed, that "benefits conferred" are too frequently taken by those who obtain them as "recompenses earned;" and that, consequently, for such benefits thanks are not only not required, but ought not to be paid. For our own parts, we entertain no such opinion, and should heartily rejoice to see that artists and men of letters are not behind corn-law leaguers and cotton-printers, in their willingness to recognise a great and important benefit to individuals as well as to the mass.